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NOTES AND NEWS.

MR. R. BENTLEY, emeritus professor of botany in King's College, London, died December 24, 1893.

MR. JOHN DONNELL SMITH sailed February 10th for another visit to Central America, whose flora he is so energetically investigating.

DR. RICHARD SPRUCE, the well-known English traveler, collector and hepaticologist, died at his home at Coneythorpe on the 28th of December, at the age of seventy-six.

MR. G. H. HICKS, instructor in botany in the Michigan Agricultural College, has been appointed assistant botanist in the Division of Botany of the Department of Agriculture.

MR. ALBERT F. WOODS, assistant in botany in the University of Nebraska, has been appointed assistant pathologist in the Division of Vegetable Pathology of the U. S. Department of Agriculture.

IN THE ABSENCE of Prof. V. M. Spalding from the University of Michigan for a year's study in Germany, Mr. F. C. Newcombe, who returned from Europe last summer, has been placed in charge of the instruction in botany.

DR. E. BONAVIA has been trying to identify the plants of the Assyrian monuments. In some cases the identification seems to be sure enough; in others the representations are so conventional as to give rise to large diversity of opinion.

NOTICE has been received of the death of Rev. Samuel Lockwood, Ph. D., of Freehold, N. J., which occurred January 13th. Professor Lockwood was an ardent naturalist and a very ready writer. He was one of the first subscribers to the GAZETTE, and made several contributions to its earlier volumes.

OF THE ANNUAL REPORTS of experiment stations for 1892 two are especially interesting for their botanical matter: Vermont and New Jersey. The former contains fifty-five pages on plant diseases, by L. R. Jones, and the latter 112 pages on plant diseases and weeds, by B. D. Halsted. Both reports are well illustrated.

HEDWIGIA appears in an enlarged and somewhat altered form. Each bi-monthly part is to consist of 64-80 pages, with 2-3 plates. The original articles are to be paged separately from the abstracts of cryptogamic literature, and will occupy from 16-32 pages. The price is increased from eight to twelve marks.

IT SEEMS that the "Russian thistle" (*Salsola Kali* var. *Tragus*), which has proved so destructive in South Dakota is threatening to spread over Nebraska. Bulletin 31, of the Agric. Exp. Station of Nebraska, prepared by Dr. Bessey, deals with the subject, giving an account of the structure of the plant and suggestions as to co-operation for its eradication.

IN THE Linnean Society's Journal (30: 51), the first paper by Mr. J. C. Willis, under the title, "Contributions to the Natural History of the Flower" appears. It discusses the fertilization of *Claytonia* (two species), *Phacelia* (five species), and *Monarda* (three species), and is illustrated by one plate. It seems that the writer is presently to visit the western United States, where some of the species of the paper and others can be studied in their native haunts.

THE PRIZE of 500 francs, founded by Augustin-Pyramus de Candolle will be awarded by the Société de physique et d'histoire naturelle de Genève for the best unpublished monograph of a genus or family of plants submitted through the president, M. Ch. Soret, before January 15, 1895. The manuscripts may be written in Latin, French, German (Roman letters), English or Italian, and the society will publish the accepted one in its quarto memoirs if agreeable to the author.

IOWA AGRICULTURAL COLLEGE has recently purchased the Parry Herbarium and Library for the sum of \$5,000, which it hopes to make of service to the working botanists of this country. This collection was brought together by Dr. C. C. Parry, who died in 1890. It is especially rich in West-American plants. The specimens are in excellent condition and with the 25,000 specimens now in the college collection there is an abundance of material for a large herbarium.

ON THE EIGHTH of December, 1893, Professor Dr. Jacob George Agardh celebrated in Lund, Sweden, his eightieth birthday. On this occasion Prof. Dr. J. B. De Toni, on behalf of a large number of phycologists, presented to the distinguished Swedish algologist, an artistically gotten up address with the signatures of all those taking part therein. The simple text of the address runs: "Clarissimo phycologo —J. G. Agardh—ineunte aetatis suae anno octuagesimo—(8. Dec. MDCCCXIII—MDCCCXCIII)—gratulantes offerunt aestimatores." —Bot. Centralb. 57: 96. 1894.

MR. A. D. HOPKINS, entomologist of the West Virginia Agricultural Experiment station, has ready for printing the manuscript and illustrations for a popular bulletin on "Defects in wood caused by insects," and "Black holes in wood." The bulletin will contain over forty figures from original drawings and photographs from nature, with accounts of the characters of the defects and the insects causing them; simple and inexpensive methods of preventing the occurrence of certain kinds, together with other matter intended to be of interest to the general reader. It will be sent free to those requesting it.

IN THE *Bulletin of the Torrey Botanical Club* (Dec.) Mr. John K. Small gives an account of the altitudinal distribution of the ferns of the Appalachian mountain system, representing a kind of work in geographical distribution that deserves much careful attention. In addition to the stations, with their elevations, each species, following the lines of Allen's Geographical Distribution of N. Am. Mammals, is referred to one of four faunal areas, viz.: Canadian, Alleghanian, Carolinian, and Louisianian. In the same number Dr. Thomas Morong gives some interesting results of his studies among monocotyledons.

DROPSICAL DISEASES of plants constitute a new class of maladies brought to light within a year by Prof. Geo. F. Atkinson, of Cornell University. He writes in *Science* (Dec. 15, 1893), of tomatoes and apples thus affected; and in *Garden and Forest* of a later date (Dec. 27, 1893), adds an account of violets grown in forcing houses, which suffered severely in a like manner. In the last case the small veinlets on the under side of the leaf show little swellings, which finally dry up, the leaf gradually turns yellow and dies. An instance is cited where all the plants of a large establishment lost their leaves from this cause, and became worthless.

THE BOTANICAL SEMINAR of the University of Nebraska has undertaken the publication of a "Flora of Nebraska," in which the entire flora of the state is to be described. The work will appear in twenty-five parts, not more than three or four in any one year, and will cost one dollar a part. Illustrations are to be freely used to illustrate the lower groups and the more difficult phanerogams. While the prospectus is apparently addressed to students of botany in Nebraska it is of decided general interest, as it not only represents an effort unique in this country, but deals with one of those "middle regions" that have never had fair treatment at the hands of manuals.

IN THE *Journal of Botany* (Jan.) Mr. F. N. Williams discusses the primary subdivisions in the genus *Silene*. He points out the "inconvenience of regarding the mode of præfloration in the petals as a primary character." The primary divisions he bases on the structure of the calyx, slightly modifying Rohrback's arrangement, and follows Engler and Prantl in regarding each division as a subgenus, of which three are recognized. The delimitation of the genus by the character of a unilocular capsule septate at the base transfers many of the North American species to the genus *Melandryum*.

IN THE Proceedings of the Cambridge (England) Philosophical Society (8: part 2), Messrs. J. C. Willis and I. H. Burkill give the results of observations on the flora of the pollard willows near Cambridge. The willows were pollarded at a height of eight feet, and stood in rows a few yards apart. Their tops contain large masses of humus, in which occur many plants. No less than eighty species have been found growing in this situation. In abundance of occurrence *Galium Aparine* heads the list, followed by *Sambucus* and *Rosa*. *Urtica* and *Crataegus* are also common. Questions as to the mechanism of seed distribution are suggested. The fact that birds' nests are common in willow tops led to an investigation also of the plants used in building.

AT THE EIGHTH annual session of the Iowa Academy of Sciences, the following botanical papers were read: T. H. McBride: Notes on the North American Cycads, and The distribution of *Rhus typhina*; S. Calvin: On the geological position of *Bennettites dacotensis* McBride, with observations on the stratigraphy of the region in which the species was discovered; A. C. Spencer: A Mazon flora in Iowa; Mary A. Nichols: Observations on the pollination of some of the *Composite*; B. Fink: Some additions to the flora of Iowa; L. H. Pammel: Powdery mildew of the apple, Farther notes on *Cladosporium carpoph-*

ilum Thüm., and Notes from the botanical laboratory of Iowa Agricultural College. The presidential address was also given by Prof. Pammel, the subject being: Bacteria; their relation to modern medicine, the arts and industries.

THE EDITORIAL PLEA for more attention to physiological research in the state agricultural experiment stations, given in a recent number of *Experiment Station Record* (5: 270-271), is to be heartily commended. A few sentences may be quoted here: "The systematic investigation of the physiology of particular species of plants throughout their life history is greatly needed. The practical, as well as the scientific, importance of such researches in the case of cultivated plants is very great. It is true that physiological inquiries, whether on plants or animals are difficult to carry on. However these things which are hard to find out are the very ones our institutions for experimental research should seek after. Wherever opportunity offers laboratories should be equipped and trained workers employed for investigations on the physiology of cultivated plants."

IN THE *American Naturalist* (Jan.) Dr. Chas. E. Bessey presents a synopsis of the larger groups of the vegetable kingdom. This synopsis, in chart form, had already been distributed and welcomed in our laboratories. The slime moulds have been excluded, as more properly belonging to the animal kingdom. The "classes" are those usually recognized, but in the first two the limits have been slightly extended. The groups below classes are tentatively called "orders," and as the orders of the lower plants are found to be equivalent to the "series" of Bentham and Hooker, the former term is made to supersede the latter, and the so-called "orders" of the manuals become simply "families." Of course the group of "Apetalæ" is not kept separate, and apocarpous and hypogynous characters are regarded as primitive and lower than the syncarpous and epigynous condition. The six "branches" are Protophyta (fission algae, including bacteria), Phycophyta (green and brown algae), Carpophyta (the old "spore-fruit" group), Bryophyta, Pteridophyta, and Anthophyta.

THE RADIATION AND ABSORPTION of heat by leaves has been studied by A. G. Mayer (Am. Jour. Science 45: 340-346. 1893). He found that the leaves of ash, elm, maple, cherry, horse chestnut, lilac, mullein, burdock and chicory absorb from 77 to 86 per cent. of heat falling upon them, and transmit from 14 to 23 per cent. The radiation is the same as the absorption. Variations are largely due to individual differences of the leaves of the same species, there being little difference between species of even widely separated genera, or between species with very different texture of leaves. Thus, the leaves of maple and mullein are essentially alike in their relation to heat. The petals of rose and other flowers transmit much more heat, and retain less, than leaves. The upper and lower surface of leaves were not found to differ in their behavior toward heat, with the single exception of burdock, which radiates but four-fifths as much from the lower as from the upper surface. Leaves are among the best absorbers and radiators of heat known. A coating of dew over the surface, however, will reduce the radiation by one-third.

AT A RECENT meeting of the botanical section of the Schlesische Gesellschaft für Vaterländische Cultur, Dr. Ferdinand Cohn spoke on formic aldehyde and its effect on bacteria. Among other interesting matters he called attention to Hauser's method of permanently fixing gelatin tube and plate cultures of bacteria by vapor of formic aldehyde, obtained by pouring a few drops of the solution on cotton. Microscope preparations may be then made by cutting out little pieces from such plate cultures. The permanence of these fixed cultures depends on the formation on contact with the vapor of a solid and hard modification of gelatin, which is not fluid at any temperature. Gelatin liquefied by bacteria is also rendered solid, while retaining the optical appearance of its fluid condition.

Cohn also found that very dilute watery solutions of formic aldehyde preserve plant tissues and organs, as well as the delicate algae perfectly. The blackening often occasioned by alcohol is not produced, and the green color is completely preserved. The permanence of these materials can only be known after longer tests than the six months which these have continued. The addition of 15-20^{ccm} of the commercial 40 per cent. solution to a liter of water makes a solution of preservative strength. In working with formic aldehyde care must be exercised, as its vapor produces severe headache and irritates the mucous membranes.

THE Geological and Natural History Survey of Minnesota is organized upon a very liberal basis, especially favoring exploration and publication. The Bulletins, issued from time to time, have contained much valuable material. The state botanist, Professor Conway MacMillan, now proposes to publish Bulletin no. 9 in parts, under the title, "Minnesota Botanical Studies," until a volume is completed. The first part (Jan. 16, 1894), contains the following papers: "On the occurrence of sphagnum atolls in Central Minnesota," by Conway MacMillan, in which the structure and origin of these peculiar annular structures are discussed; "Some extensions of plant ranges," by E. P. Sheldon, in which a new *Polygonum* and a new *Aster* are described; "On the nomenclature of some N. Am. species of *Astragalus*," by E. P. Sheldon, in which the recent American rules of nomenclature are applied and two new species described; "List of fresh-water algae collected in Minnesota during 1893," by Josephine E. Tilden, including eighty-nine numbers; "On the poisonous influence of *Cypripedium spectabile* and *C. pubescens*," by D. T. MacDougal, in which the poisonous effects of the former are reported to have been demonstrated, and inferred for the latter. A peculiar pointed hair and a glandular hair are looked to as possible causes of the irritation. Three plates illustrate the new *Polygonum*, the new *Aster*, and the hairs of *Cypripedium*.

IN THE *Kew Bulletin* for October and November (1893), some account is given of the botanical exploration of Sikkim-Tibet frontier (Bengal province of N. India). A long report is given by G. A. Gamme of a botanical tour in Sikkim in 1892, accompanied by a note from Sir Joseph Hooker, which comments in such an interesting way upon the general botanical features of the region that we quote as follows:

"Mr. Gammie's report strengthens in me the opinion which I have long entertained, but which I have never formulated, that Sikkim, for its area, presents one of the richest, if not the richest, botanical regions of the globe. And further, that though no more than about forty miles from east to west, and 100 from north to south, and situated beyond the northern tropic, I believe that, when all that is known of its vegetation shall have been brought together, it will prove to be a better microcosm of the flora of the globe than any other area of equal or even much larger dimensions.

Thus, in its alpine region, the floras of the European, Siberian, Chinese, and American mountains are all richly represented, and there also are found the principal types of the steppe and desert vegetations of Tibet and Central Asia. In its temperate region European genera abound in species in greater numbers than they do further west in the Himalaya, or probably than they do further east in the same range, where different climatic features prevail; and in the same region types of Chinese, Japanese, and North American (both eastern and western) genera appear in force, and which rapidly disappear in advancing toward the Western Himalaya. Lastly, in the tropical region, the Malayan flora disputes precedence with those of the plains and lower hills of the Indian continent, Burma and Ceylon, as represented by genera and species, many of which are also characteristic of tropical Africa. In short, with the exception of the prevalent types of the Australian, South African, and South American floras, there are few others that do not meet the eye of the wanderer in Sikkim."

DR. D. H. CAMPBELL is continuing his studies of the general relationships of the pteridophytes, and is each year furnishing more and more material upon which to base a natural classification. The latest subject of his investigation has been the development of *Azolla filiculoides* Lam. It seems that it is this species rather than the eastern *A. Caroliniana*, that is found in California. With abundance of living material accessible, the author has made a complete study of the development of *Azolla*, concerning which little is known. The anatomy of the mature sporophyte had been thoroughly presented by Strasburger, but the account of the development of the prothallia and embryo was still incomplete.

After giving a brief account of the structure of the mature sporophyte, the author describes the development of the macrosporangia, the germination of the microspores, the germination of the macrospores, the development of the archegonia, of embryo, of the cotyledon, of the stem-quadrant, of the root, and of the foot. In every case resemblance to no other form is indicated by the development of *Azolla*, and the genus seems an isolated one, with *Salvinia* as its nearest living ally.

The general conclusions as to relationships are summed up as follows:

"That the two families of the Hydropteridæ represent the ends of two different lines of development. Of these the *Salviniacæ* have been derived from the lower members of the leptosporangiate series, possibly from near the *Hymenophyllaceæ*, and that the *Marsiliacæ* have arisen from forms more like the *Polypodiaceæ*. Of the two families, the *Salviniacæ* have departed less from the parent stock in re-

gard to the reduction of the sexual generation, but the sporophyte is much less like that of the ordinary homosporous forms than that of the Marsiliaceæ.

The two genera of Salviniaceæ differ much more from each other than do those of the Marsiliaceæ, and it is not at all likely that one form has been derived from the other but that the two genera diverge at an early stage in the development of the line."

RECENT EXPERIMENT STATION bulletins include excellent data on methods and profit of spraying orchards, and on some new fungicides, by E. G. Lodeman (Cornell, N. Y., no. 60); on effect of fungicides upon germination of corn, with bibliography, by A. S. Hitchcock and M. A. Carleton (Kans., no. 41); on club root of cabbage and its allies, by B. D. Halsted (N. J., no. 98); on the tomato and some of its diseases, by P. H. Rolfs (Fla., no. 21); on common fungous diseases and methods of prevention, also on dodder, by C. V. Piper (Wash., no. 8); on the Russian thistle in Nebraska, by C. E. Bessey (Neb., no. 31); on the Russian thistle in Wisconsin, by E. S. Goff (Wisconsin, no. 27); and on winter-killing of trees and shrubs, by Aven Nelson (Wyoming, no. 15). The last is directed toward the causes of desiccation in winter and at high altitudes. Experiment showed that lowering the atmospheric pressure produced increased loss of moisture from an *Ilex* plant. Nevada weeds is a subject that is treated by F. H. Hillman (Nev., no. 21) in a manner that is almost model. A novel feature is introduced by attaching a fragment of the plant with a few seeds to the page to accompany the description. Eight of the most common weeds are described, half being illustrated with admirable half-tone cuts in addition to the dried specimens. A bulletin on fruit blight in general, by J. M. Stedman (Ala., no. 50), is a good example of pseudo-science, not half of the statements being true, and the experimental part being entirely unreliable. Electro-culture is again taken up by C. D. Warner (Hatch, Mass., no. 23), and although the experiments are apparently elaborate, they are almost wholly empirical, and grossly lacking in scientific detail. No attempt seems to have been made to determine the amount of current passing through the soil, but as near as one can judge from the data given, it was not half the total efficiency. Of course the amount of current passing exclusively through the wire is immaterial, unless magnetic effects are to be assumed, which is highly improbable. The author does not tell us whether a stimulation of the physiological action of the plant or electrolysis of the constituents of the soil is to be expected. The former is scarcely probable and the latter is out of the question with an alternating current. More profound experiments are needed to secure data of much value.